

## Claims

What is claimed is:

- [c1]** A method for calculating seismic quality factor from a seismic data trace, comprising:  
calculating a first and a second minimum phase inverse wavelet at a first and a second time interval along the seismic data trace;  
synthetically dividing the first wavelet by the second wavelet  
Fourier transforming a result of the synthetically dividing;  
calculating a logarithm of a result of the Fourier transforming; and  
determining a slope of a best fit line to the logarithm of the amplitude result of the Fourier transform.
- [c2]** The method of claim 1 further comprising averaging quality factor values over a selected number of seismic traces adjacent the seismic data trace along a structural dip determined by calculating a time displacement of correlative events between the adjacent traces.
- [c3]** The method of claim 2 further comprising averaging quality factor values over a selected number of time samples adjacent a selected time sample in each of the seismic data trace and the adjacent traces.
- [c4]** The method of claim 3 further comprising determining a Euclidean distance from a selected time sample in the seismic data trace to each of the selected time samples in the adjacent traces, and assigning a Gaussian weight based on each Euclidean distance.
- [c5]** The method of claim 4 wherein the Gaussian weight at a largest one of the Euclidean distances is set to about 0.25.
- [c6]** The method of claim 1 further comprising adaptively updating the first and second minimum phase inverse wavelets with respect to time.

- [c7]** A computer program stored in a computer readable medium, the program having logic operable to cause a computer to perform a method for calculating seismic quality factor from a seismic data trace, the logic operable to cause the computer to perform:  
calculating a first and a second minimum phase inverse wavelet at a first and a second time interval along the seismic data trace;  
synthetically dividing the first wavelet by the second wavelet  
Fourier transforming a result of the synthetically dividing;  
calculating a logarithm of a result of the Fourier transforming; and  
determining a slope of a best fit line to the logarithm of the amplitude result of the Fourier transform.
- [c8]** The computer program of claim 7 further comprising averaging quality factor values over a selected number of seismic traces adjacent the seismic data trace along a structural dip determined by calculating a time displacement of correlative events between the adjacent traces.
- [c9]** The computer program of claim 7 further comprising averaging quality factor values over a selected number of time samples adjacent a selected time sample in each of the seismic data trace and the adjacent traces.
- [c10]** The computer program of claim 7 further comprising determining a Euclidean distance from a selected time sample in the seismic data trace to each of the selected time samples in the adjacent traces, and assigning a Gaussian weight based on each Euclidean distance.
- [c11]** The computer of claim 8 wherein the Gaussian weight at a largest one of the Euclidean distances is set to about 0.25.
- [c12]** The computer program of claim 7 further comprising adaptively updating the first and second minimum phase inverse wavelets with respect to time.